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GB 1031871 A

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(54) Cartridge dispenser

(57) A dispenser suitable for dispensing a continuous length explosive cartridge, or numerous cartridges joined together, comprises a cylinder 5, with flanges 7, carrying wound cartridge and being supported by bearings 3 in planar supports 2 within box 1. A box opening allows the cartridge, with detonators and detonating card, to be unwound and passed, for example, down a bore hole (Fig. 3). Spindle 6 is supported by the bearings. The dispenser may be made of wood, plastics or cardboard, with no metal. The box may enclose more than one reel.

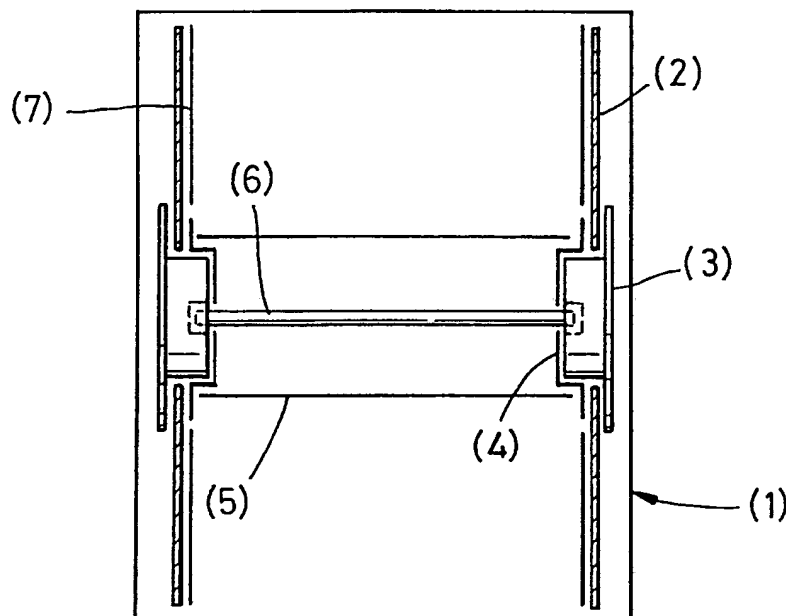


Fig. 1 BEST AVAILABLE COPY

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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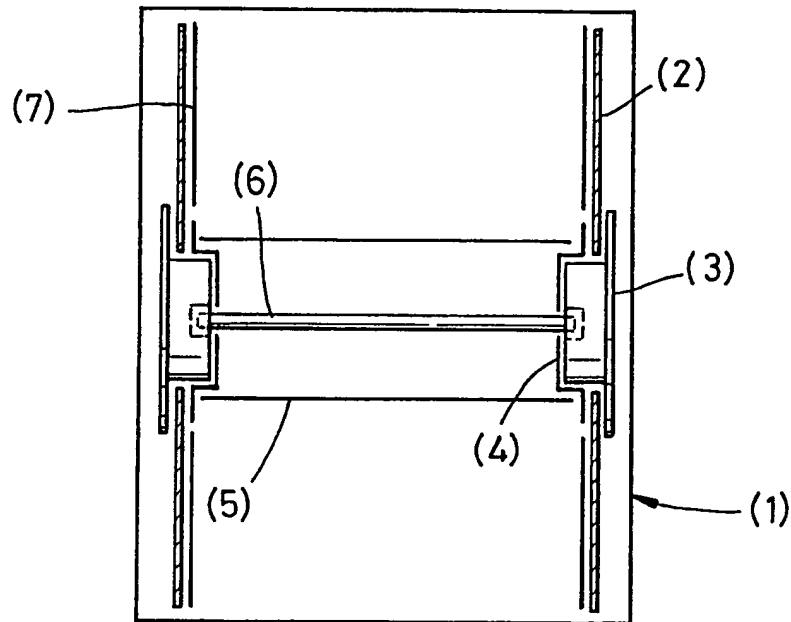


Fig. 1

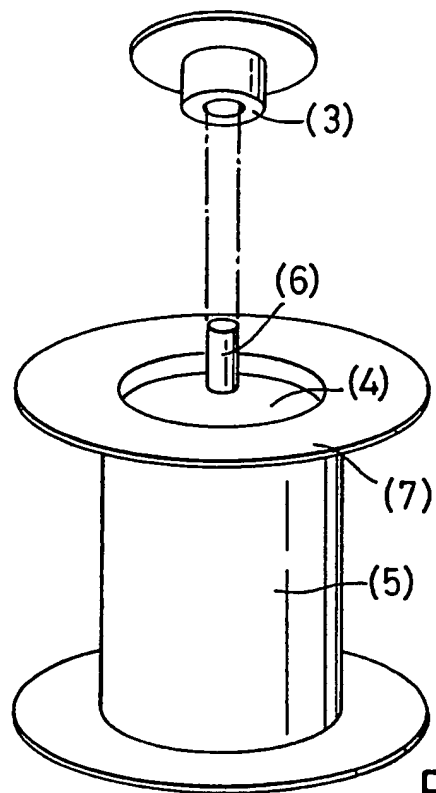


Fig. 2



## EXPLOSIVES DISPENSER

This invention relates to an apparatus for storage, transportation and dispensing long lengths of explosive cartridge(s).

5         Dispensers for rolls of various materials are well known. Adhesive tape, string and paper towels are routinely dispensed from rolls. Australian patent AU-72750/87 describes a dispenser for dispensing sheet material from a roll. Wire is  
10 often supplied from a dispenser as described in US Patent No. 4,978,085 and US Patent No. 3,989,203 and 4,485,984 describe creels for pile fabrics.

       The dispensers of the prior art are characteristically adapted for supplying household  
15 items such as adhesive tape or hardware such as wire and cable. Such dispensers are not adapted for the safe storage, transportation and dispensing of explosive substances such as lengths of cartridged, non-rigid explosive.

The current invention was developed in order to safely, easily and inexpensively pack long length explosive cartridges for storage or transport and to provide a simple means for dispensing said long  
5 length explosive cartridges.

Explosive packaging must conform with the minimum safety requirements set out by legislation as well as protecting the product from damage or deterioration and fulfill the requirements of the  
10 consumer. The Victorian Statutory Rules 1988 No. 272, Dangerous Goods (Explosives) Regulation 1988 and the Transport Code are typical of the types of legislation with which packaging and transport must comply.

15 Apart from the statutory requirements for safe explosives packaging, manufacturers and suppliers desire that their explosives suffer no deterioration during transport and that they are easy and safe for the purchaser to unpack and  
20 handle.

In the packaging of explosive materials care is taken to avoid the use of metals, especially iron or steel, due to the hazards of static electricity build up which can result in unexpected detonation.  
25 Nails, staples and other closure devices made of metal are excluded from use in explosives packaging unless they are covered with a protective materials which adequately prevents contact between the explosive material and the metal.

30 Many plastics are excluded from use in direct contact with explosives in view of the hazards such as static electricity build up.

Some components found in explosives compositions such as ammonium nitrate are highly corrosive and such properties also influence the materials used to package such compositions.

- 5        In certain explosives products the actual explosives materials is contained within cartridges which are typically cylindrical or similarly shaped wrappers. These wrappers are commonly paper or plastic film typically closed at the ends by clips.
- 10    For transport and storage such cylindrical cartridged explosives are usually packed into specifically designed plastic lined cardboard boxes.

- The packaging of such cylindrical cartridges into boxes presents some packaging difficulties. It
- 15    is common practice for explosive manufacturers to supply explosives cartridges of up to 200 mm diameter and 66 metres in length but greater diameters and lengths are possible. The packaging of such long length cartridges or plurality of short
- 20    cartridges connected to make a long length cartridge, requires them being laid in loops in the box or carton. Whilst such cartridges are relatively flexible, looping them to fit into cartons or boxes can cause deleterious effects. For
- 25    example, kinks caused by bending the cartridges may cause discontinuities in the explosive material which can result in poor propogation of the explosive front upon detonation. Furthermore, sharp bends or kinks in cartridges containing emulsion
- 30    explosive compositions can result in so called "shock crystallization" of the inorganic nitrate salt(s) and loss of sensitivity and/or explosive strength of the explosives composition. .

Many further problems exist with this sort of packaging. Spacial packing inefficiencies result from storing a loop in a box and with this form of storage the explosive is not secured in the carton  
5 and may suffer damage if it moves about during transportation. Jarring for example, can cause emulsion explosives to "shock crystallise" and splitting of the explosive wrapping can cause loss of containment of the explosive composition.  
10 Removal of very long lengths of packaged explosive from a box is also very clumsy and inefficient.

Apart from the aforementioned statutory requirements and practical problems with packaging long lengths of packaged explosive, manufacturers  
15 and suppliers of explosives also seek to minimise packaging cost, weight and design complexity.

It has now been found that the problems associated with packaging a length explosive cartridge can be lessened by the current invention.  
20 According to the present invention there is provided a dispenser for dispensing a length of cartridged explosive which dispenser comprises:

a substantially box-shaped body defining a chamber in which a reel of cartridged  
25 explosive can be accommodated;

substantially planar vertical reel supports located within said chamber at opposing faces of said chamber each comprising an aperture adapted to accommodate a bearing;

a reel comprising a cylinder, the axis of which lies normal to the plane of the reel supports, the ends of said cylinder being adapted to seat a bearing;

5 and two bearings, each seated in opposing ends of said cylinder, each bearing adapted to one reel support thereby supporting said reel between said reel supports so that said reel may rotate while said reel support  
10 remain stationary with respect to said box-shaped body.

In a preferred embodiment the dispenser of the invention also comprises a spindle which passes essentially along the axis of the cylinder, each end  
15 of said spindle being seated in one of said bearings. In a particularly preferred embodiment the spindle which passes essentially along the axis of the cylinder has one fixed and one spring retention clip to hold said reel ends in said  
20 cylinder.

In a more preferred embodiment the reel of the dispenser also comprises flanges located at or near each end of said cylinder and adapted to retain a roll of cartridge explosive within the length of  
25 said reel.

In blasting operations a single long continuous cartridge may be used in the borehole but often numerous cartridges are attached together to form a long explosive cartridge. Cartridges are  
30 commonly attached together by taping them to each other or to detonating cord. Where used herein the term long length explosive cartridge is used to refer to either a single cartridge of more than 0.1 m length or numerous explosive cartridges which have been attached together.



The dispenser can be of any convenient construction materials which satisfy statutory requirements for packaging and transport of packaged explosives. In a preferred embodiment of the  
5 current invention the ends of the cylinder, the bearings and the optional spindle are plastic while the box shaped body, the reel supports and the cylinder and flanges are cardboard. In a particularly preferred embodiment the box shaped  
10 body is constructed of 5 mm thick corrugated cardboard, the reel supports are of 9 mm thick waxed double laminated corrugated cardboard, the flanges and cylinder are of 2 to 3 mm thick paperboard and the spindle, the ends of the cylinder bearings are  
15 plastic.

When empty of explosives it may be convenient if the dispenser can be converted into a condensed form for storage. Hence in a preferred embodiment of the current invention the box shaped body the  
20 reel supports, the cylinder the flanges, the bearings and the spindle can be disengaged from one another and the box shaped body folded flat. It is also preferable that the dispenser can be disassembled and re-assembled manually and without  
25 the need for tools.

Winding of long explosive cartridges onto a reel can be carried out manually however it is usually preferable that this be done automatically. Typically in a production plant it would be  
30 preferable for the long explosive cartridge to be wound onto a reel immediately it is produced. In a preferred embodiment the reel of the current invention includes a hole in the end of the cylinder or flange which can engage a drive pin and another

hole in the end of the cylinder or flange which can engage a locking pin, such that the reel can be attached by these two pins to a mechanism for rotating the cylinder in order to wind a long explosive cartridge onto the reel.

Preferred embodiments of the present invention will now be described by way of the following examples and with reference to the accompanying drawings in which:

Figure 1 is a plan view of a preferred embodiment of the dispenser of the current invention;

Figure 2 depicts the interrelationship between the flanges, the cylinder, the spindle and the bearings in a dispenser of the present invention; and

Figure 3 depicts downhole loading using the dispenser of the invention.

The invention depicted in Figure 1 includes a box shaped body (1), two reel supports (2), each having a recess in which may be located a bearing (3) which is seated in the end of the cylinder (4), a cylinder (5), a spindle (6) and flanges (7). The box shaped body would optimally include an opening through which the long explosive cartridge may pass or alternatively a side or flap which can be articulated to form an opening.

Figure 2 is a view of the preferred embodiment of the bearing (3) the end of the cylinder (4) the cylinder (5), the spindle (6) and optional flanges (7). It will be obvious to the

person skilled in the art that the bearing can be of any convenient shape such that it allows the reel to rotate relative to the reel supports. In a preferred embodiment the bearing is flanged and  
5 relatively broad to adequately support the reel on the reel supports.

The invention described is suitable for use in the process of loading a borehole. Figure 3 shows cartridges (1), detonators (2) and detonating  
10 cord (3) located in boreholes (4). In the loading process a length of detonating cord (3) to which is taped a number of explosive cartridges is pulled by its free end from the dispenser (7) such that it  
unwinds from the reel (8) and is passed manually  
15 from the dispenser into a borehole (4). Once the borehole is loaded, the detonating cord can be attached to the exploder box (5).

Dispensers of the present invention have the advantage of being capable of low cost of  
20 construction and may be assembled and disassembled without the aid of tools. Dispensers of the current invention also have the advantage that in the disassembled form they can be packed relatively flat and is thus easily and conveniently transported.  
25 Moreover, dispensers of the current invention may also be adapted to comply with the statutory regulations for packaging and transport of explosives. The dispenser may also be suitable for dispensing continuous lengths of explosive  
30 cartridges with or without detonating cord attached.

It will be apparent to the skilled artisan that further embodiments are possible. For example, more than one reel could be located in the box shaped body. This could be useful where, for  
5 example, explosives of different diameter or type are required to be dispensed together. Alternatively, one or more of the reels may be wound with detonating cord or similar elongate explosive accessory.

10         Dispensers of the current invention are suitable for the storage, transport and dispensing of cartridged explosive formulations and/or elongate explosive accessory such as detonating cord.

       The attributes and preferred embodiment of  
15 the invention is further revealed by the following non-limiting example.

#### Example

       An example dispenser was constructed, loaded with a long explosive cartridge and submitted for  
20 testing according to the requirements of Packaging Group 2 of the Australian Code of Transport for Explosives and Dangerous Goods.

       The explosive dispenser was constructed according to the following specifications. The box  
25 shaped body of the dispenser was constructed from 5 mm thick corrugated cardboard complete with collar and 100  $\mu$ m thick plastic liner measuring 900 mm x 740 mm. The internal dimensions of the box were 440 mm x 440 mm x 250 mm. The reel supports  
30 consisted of double laminated, waxed, corrugated cardboard, approximately 9 mm thick and 425 mm x 425 mm square. The bearings were situated in a 75 mm circular hole cut in the centre of the reel

supports. The cylinder was constructed from 3 mm thick paperboard and was of 127 mm diameter and 210 mm in length. The flanges were constructed of 2.4 mm thick paperboard, were 400 mm diameter. The bearing, ends of the cylinder and spindle were all constructed of PVC. The spindle was 25 mm diameter, 250 mm long and hollow, having a 2 mm wall thickness.

The explosives dispenser was loaded with a 35 m long, 25 mm diameter cartridge of emulsion explosive. According to the testing requirements, each of 5 boxes were independently dropped from a 1.2 m height such that they landed on one of their flat sides or a corner. The explosive dispenser fulfilled the requirements of the testing that there be no damage arising from drop testing that would be liable to affect the safe transport of the explosive.

The claims defining the invention are as follows:

1. A dispenser for dispensing a length of  
cartridged explosive said dispenser comprising:

a substantially box-shaped body defining a  
chamber in which a reel of cartridged  
explosive can be accommodated;

two substantially planar vertical reel  
supports located within said chamber at  
opposing faces of said chamber each  
comprising an aperture adapted to  
accommodate a bearing;

a reel comprising a cylinder, the axis of  
which lies normal to the plane of the reels  
supports, the ends of said cylinder being  
adapted to seat a bearing;

and two bearings, each seated in opposing  
ends of said cylinder, each bearing adapted  
to engage one reel support thereby supported  
said reel between said reel supports so that  
said reel may rotate while said reel supports  
remain stationary with respect to said  
box-shaped body.

2. A dispenser according to claim 1 wherein said  
dispenser also comprises a spindle which passes  
along the axis of said cylinder, each end of said  
spindle being seated in one of said bearings.

3. A dispenser according to claim 2 wherein said  
dispenser comprises a spindle which passes along the  
axis of said cylinder having one fixed and one  
spring retention clip which hold the reel ends in  
said cylinder.

4. A dispenser according to claims 1 to 3 which additionally comprises reel flanges are located at or near each end of the cylinder.
5. A dispenser according to claim 4 wherein the reel includes two holes for inserting a locating pin and a drive pin.
6. A dispenser according to any of claims 1 to 5 which can be dismantled without the use of tools to its elements consisting of the box shaped body, the reel supports, the cylinder, the reel ends, the spindle and the bearings.
7. A dispenser according to any of claims 1 to 6 which excludes metal from its construction.
8. A dispenser according to any of claims 1 to 6 in which each element is entirely constructed from wood or plastic or cardboard.
9. A dispenser according to any of claims 1 to 6 which is adapted to accommodate more than one reel of cartridged explosive.
10. A cartridged explosive composition packaged in a dispenser as defined according to any of claims 1 to 9.
11. A cartridged explosive composition or explosive accessory packaged in a dispenser as defined according to any one of claims 1 to 9.
12. A dispenser substantially as herein described with reference to the Figures 1 to 3.

13. A method of dispensing long explosive cartridges substantially as herein described.



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**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**section 17 (The Search Report)**

Application number

GB 9222087.0

**Relevant Technical fields**

(i) UK Cl (Edition K ) B8M: MB2, MB3, MB4, MB5, MB6  
 MB9, MJC

(ii) Int Cl (Edition 5 ) B65D: B6SH

Search Examiner

G WERRETT

**Databases (see over)**

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

24 NOVEMBER 1992

Documents considered relevant following a search in respect of claims 1 TO 13

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1031871 (SOUTH RNER) Whole document	1, 2
X	GB 341983 (W T BARNES) Whole document	1
X	GB 229855 (A TURNER) Whole document	1
X	GB 203028 (A E ISTED) Whole document	1

Category	Identity of document and relevant passages	Relevant to claim(s).

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